Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

Title V draft permit No. V-00-010
MARTEK BIOSCIENCES CORPORATION
WINCHESTER, KY
MARCH 15, 2000
JOHN LEWIS, REVIEWER
Plant I.D. # 021-049-00032
Application Log # G102

SOURCE DESCRIPTION:

The Martek Biosciences facility in Winchester produces two single cell oils, each of which is enriched in a specific fatty acid. One is a triglyceride oil enriched in DHA (docosahexaenoic acid) derived from a marine microalgae (DHASCO®) and the second is a triglyceride oil enriched in ARA (arachidonic acid) derived from a common soil organism (ARASCO®). The process begins when a biomass is produced through cultivation of a starter seed culture, particular to the oil to be produced, in a series of increasingly larger fermentors. After the final fermentation, in the case of the marine algae, the biomass is spray dried. The ARASCO® biomass must be dried through other means at a toll processing facility. The oil is extracted from the dried biomass using a hexane extraction process. The oil is winterized, refined, bleached, and deodorized to produce the final product.

COMMENTS:

Emission factors and their source:

EP 01-03 Boilers: Natural gas boiler emissions were calculated according to AP-42, Section 1.4.
EP 04 Spray dryer: Emission calculations are based on the results of particulate emissions tests performed on January 7, 2000. Emissions for the combustion of natural gas were calculated according to AP-42, Section 1.4
EP 05 Pilot spray dryer: A mass balance was performed by the permittee to determine an emission factor for particulate matter. Emissions for the combustion of natural gas were calculated according to AP-42, Section 1.4
EP 06 Oil extraction process: Emissions were calculated based on information provided by Martek showing commercial hexane losses per month and days of operation for the period September 1998 through August 1999. The PTE was calculated from the month (June) that had the highest hexane loss per day of operation.

Applicable regulations:

Regulation 401 KAR 59:010, New Process Operations, applies to the particulate matter emissions from units constructed on or after July 2, 1975, which are not subject to another emissions standard with respect to particulates in 401 KAR Chapter 59. This includes the following emissions points:
04 Spray Dryer: Emissions of particulate shall not exceed 3.59 lb/hr and the opacity shall not equal or exceed 20 percent.
05 Pilot spray dryer: Emissions of particulate shall not exceed 2.34 lb/hr and the opacity shall not equal or exceed 20 percent.

Regulation 401 KAR 59:015, New indirect heat exchangers, applies to the particulate emissions and sulfur dioxide emissions of indirect heat exchangers with a capacity of greater than one million BTU per hour that were commenced on or after April 9, 1972 (for indirect heat exchangers with a capacity of 250 million BTU per hour heat input or less). This includes the following emissions points:
01-03 Boilers: Emissions of particulate shall not exceed 0.451 lb/MMBTU actual heat input and opacity shall not exceed 20 percent. Emissions of sulfur dioxide shall not exceed 2.06 lb/MMBTU actual heat input.

Compliance demonstration:

EP 01-03 Boilers: No compliance demonstration is required. The potential to emit of sulfur dioxide and particulate from these natural gas boilers is less than 10% of their respective allowable emission rates.
EP 04 Spray dryer: No compliance demonstration is required. The potential to emit is considerably less than the allowable.
EP 05 Pilot spray dryer: No compliance demonstration is required. The potential to emit for particulate is less than 15% of the allowable emission rate.
EP 06 Oil extraction process: There are no allowable emission rates for the oil extraction process.

Additional comments:

The spray dryer (04) and pilot spray dryer (05) both have a cyclone associated with them. The spray dryer (04) also has a small baghouse. These cyclones and the baghouse are used for product collection, thus the division considers them to be part of the process equipment and not a control device. Neither dryer can function properly without these devices.

PERIODIC MONITORING:

EP 01-03 Boilers: The permittee shall monitor the monthly usage of natural gas in order to calculate yearly emissions.
EP 04 Spray dryer: The permittee shall monitor natural gas usage and the amount of biomass entering the spray dryer in order to calculate yearly emissions.
EP 05 Pilot spray dryer: The permittee shall monitor natural gas usage and the amount of biomass entering the pilot spray dryer in order to calculate yearly emissions.
EP 06 Oil extraction process: The permittee shall record hexane purchases in order to calculate yearly emissions.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.